

Application No. 10/643,043
Docket No. DP-308286
Amendment dated March 9, 2005
Reply to Office Action of December 9, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): An electronic assembly comprising:

a housing member comprising a heat-conductive member;

a substrate supported by the housing member, the substrate having conductors on a surface thereof;

a circuit device mounted to the substrate with solder connections on a first surface of the device that are registered with the conductors on the substrate, the device having a second surface oppositely disposed from the first surface; ~~and~~

a solid solder joint consisting essentially of an indium preform into which indium and optionally one or more alloying constituents have diffused to ~~that~~ increase the melting temperature of the solder joint above that of the indium preform, the solder joint bonding the second surface of the device to the heat-conductive member; and

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an overmold compound that encapsulates the substrate, the device, and the solder joint on the housing member, the overmold compound having a cure temperature approximately equal to the melting temperature of indium but less than the melting temperature of the solder joint so as to enable curing of the overmold compound without adversely affecting the bond formed by the solder joint between the device and the heat-conductive member.

Claim 2 (canceled)

Claim 3 (original): The electronic assembly according to claim 1, wherein the solder joint comprises indium and at least one of gold and silver in an amount of up to 0.5 weight percent.

Claim 4 (original): The electronic assembly according to claim 1, wherein the solder joint comprising indium and at least one of nickel, nickel-gold alloy, tin, and tin alloy in an amount of up to 0.5 weight percent.

Claim 5 (original): The electronic assembly according to claim 1, wherein the solder joint consists essentially of indium, at least one of gold and silver in an amount of up to 0.5 weight percent, and at least one of nickel,

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nickel-gold alloy, tin and tin alloy in an amount of up to 0.5 weight percent.

Claim 6 (original): The electronic assembly according to claim 1, wherein a thermally-conductive lubricant is not present between the second surface of the device and the heat-conductive member.

Claim 7 (currently amended): The electronic assembly according to claim 1, further comprising a structural adhesive bonding the substrate to the housing, the structural adhesive having a cure temperature approximately equal to indium but less than the melting temperature of the solder joint so as to enable simultaneous curing of the structural adhesive and diffusion of the one or more alloying constituents into the indium preform. ~~an overmold compound that encapsulates the substrate and the device on the housing member.~~

Claims 8 and 9 (canceled)

Claim 10 (original): The electronic assembly according to claim 1, wherein the heat-conductive member is a pedestal protruding from the housing member.

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Claim 11 (original): The electronic assembly according to claim 1,
wherein a portion of the housing member defines the heat-conductive member.

Claim 12 (original): The electronic assembly according to claim 1,
wherein the assembly lacks any biasing means that contacts a surface of the
substrate opposite the device and urges the device into contact with the heat-
conductive member.

Claim 13 (currently amended): An electronic assembly comprising:
a housing having an interior region;
a heat-conductive pedestal projecting into the interior region of the
housing;

a laminate substrate within the interior region of the housing and
supported by the housing, the substrate having conductors on a surface
thereof;

a circuit ~~flip-chip~~ device mounted to the substrate with solder
connections on a first surface of the ~~flip-chip~~ device that are registered with
the conductors on the substrate, the ~~flip-chip~~ device having a second surface
oppositely disposed from the first surface; and

a solid solder joint consisting essentially of an indium preform into

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~~which indium and~~ at least one alloy constituent has diffused to increase ~~that increases~~ the melting temperature of the solder joint above that of the indium preform, the solder joint bonding the second surface of the ~~flip-chip~~ device to the heat-conductive pedestal; and

a structural adhesive bonding the substrate to the housing, the structural adhesive having a cure temperature approximately equal to indium but less than the melting temperature of the solder joint so as to enable simultaneous curing of the structural adhesive and diffusion of the at least one alloy constituent into the indium preform.

~~wherein a thermally-conductive lubricant is not present between the second surface of the flip-chip device and the heat-conductive member.~~

Claim 14 (original): The electronic assembly according to claim 13, wherein the solder joint contains gold or silver in an amount of about 0.1 to about 0.5 weight percent.

Claim 15 (original): The electronic assembly according to claim 13, wherein the solder joint contains one of nickel, nickel-gold alloy, tin, and tin alloy in an amount of about 0.1 to about 0.5 weight percent.

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Claim 16 (original): The electronic assembly according to claim 13, wherein the solder joint consists essentially of indium, at least one of gold and silver in an amount of about 0.1 to 0.5 weight percent, and at least one of nickel, nickel-gold alloy, tin, and tin alloy in an amount of about 0.1 to 0.5 weight percent.

Claim 17 (canceled)

Claim 18 (currently amended): The electronic assembly according to claim 13, wherein the housing comprising a base member and a cover member that enclose the substrate and the ~~flip-chip~~ device.

Claim 19 (currently amended): The electronic assembly according to claim 18, wherein an overmold compound does not encapsulate the substrate and the ~~flip-chip~~ device.

Claim 20 (original): The electronic assembly according to claim 13, wherein a portion of the housing defines the pedestal.